

## Trend Study 2-24-01

Study site name: Calls Fort Canyon.

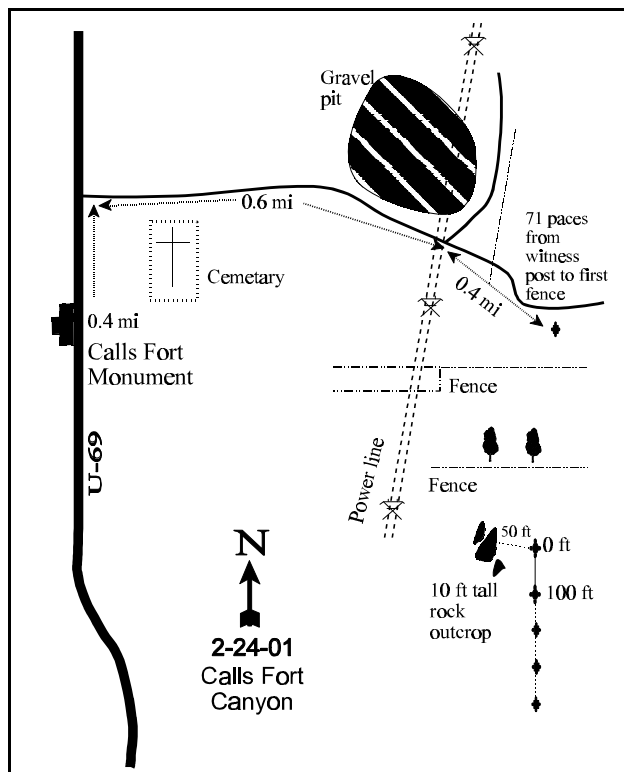
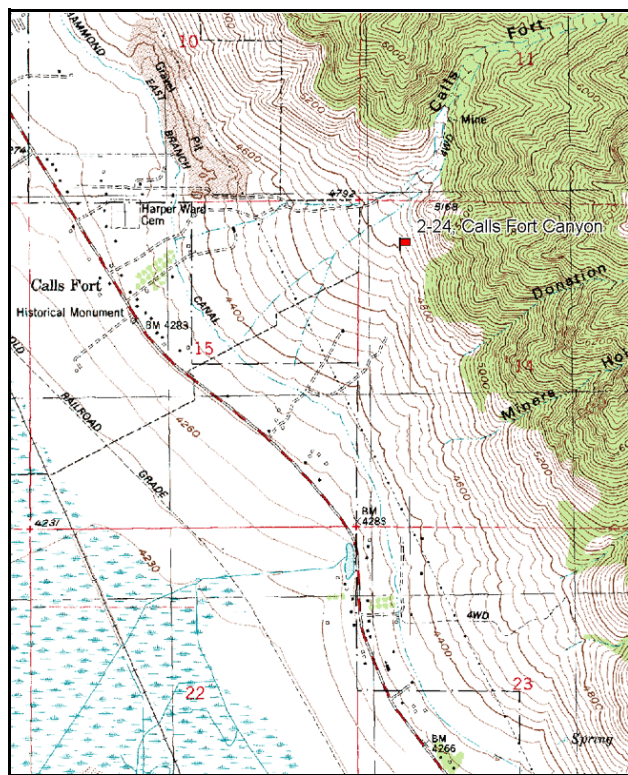
Vegetation type: Big Sagebrush.

Compass bearing: frequency baseline 170 degrees magnetic

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). Rebar: belt 1 on 3 ft, belt 3 on 2 ft, belt 4 on 1 ft.

### LOCATION DESCRIPTION

From Brigham City, proceed north to Calls Fort Monument near Honeyville. Go 0.4 miles north to a gravel pit road, 5615 North. From U-69 go east up the gravel pit road 0.6 miles to an old jeep road heading towards Calls Fort Canyon. The old jeep road crosses a laid down fence line which can be found at the base of a slightly talus slope. Bear right on the jeep road an additional 0.4 miles. From this point, walk south 195 paces across two old fences to an outcropping of large rocks. The 0-foot baseline stake is 50 feet southeast of the largest rock.



Map Name: Brigham City

Diagrammatic Sketch

Township 10N, Range 2W, Section 14

UTM 4606704 N, 413158 E

## DISCUSSION

### Trend Study No. 2-24

The Calls Fort Canyon trend study samples an extremely rocky, west facing bench located immediately south of Calls Fort Canyon on the west side of the Wellsville Mountains. Elevation of the site is 4,820 feet, which is well within severe deer winter range limits. Slope is moderate at 22%. The range type is a rather sparse and decadent mountain big sagebrush type with a dominant annual and weedy understory. Deer use was moderate to heavy in 1984, but currently there is little sign of wildlife use. Deer and elk pellet groups are infrequent and had quadrat frequencies of only 2% in 1996. A pellet group transect read on the site in 2001 estimated only 5 deer use days/acre (13 ddu/ha). No elk sign was encountered.

Soil is classified as "Sterling Gravelly Loam or Very Stony Loam." Both of these are exceptionally well drained calcareous soils derived from limestone, quartzite, and sandstone. Rate of water intake is very rapid, as is the rate of loss. As a result, complete soil drying in the upper 24 inches is common in summer which would be an advantage to annuals. Roots seldom penetrate below this depth because of a calcareous hardpan at about 16 inches and the extreme cobbly nature of the profile below 24 inches. This soil erodes very easily (Chadwick et al. 1975). The site is located just south of the mouth of Calls Fort Canyon. This location has been spared from the periodic and extremely heavy runoff originating from the canyon as evidenced by extensive spread of the alluvial fan. Nonetheless, erosion on the study site although not as serious, is still noticeable. Soil texture is a clay loam with a soil reaction that is slightly alkaline (pH of 7.7). Rocks are common on or just below the surface. Soil temperature is very high on this site averaging 78° F at 14 inches in depth.

The principal browse species is mountain big sagebrush. This species had a mostly decadent age structure (53%) and was subjected to heavy use in 1984. Reproductive success has been lacking due to strong competition for moisture from a dense understory dominated by common ragweed and annual grasses, and excessively high soil temperatures. Sagebrush density declined from 498 to 133 plants/acre by 1990, but the number of mature plants in the population remained comparable (166 to 133). Percent decadency declined from 53% to 0% as most all the decadent shrubs appear to have died. Utilization in 1990 was light. During the 1996 reading, total density of sagebrush was estimated at 740 plants/acre. Density of mature plants remained similar to 1990 estimates. However, the number of young plants increased from 0 to 560 plants/acre. Plants appear unutilized. Dead plants, included in the 1996 count, are as numerous as live plants at 740 plants/acre. Density of sagebrush increased to 980 plants/acre in 2001. Utilization is mostly light, vigor good, and percent decadence low at 8%.

The most numerous browse is broom snakeweed which has increased dramatically since 1990. Other browse species occur rarely. They include black chokecherry, woods rose, and Rocky Mountain smooth sumac. Sumac is extremely abundant on the alluvial fan north of the study site. Apparently, it responds positively to the type of erosion and sedimentation disturbance so prevalent in that area with its strongly rhizomatous habit.

The herbaceous understory is dominated by annual grasses, consisting mainly of Japanese brome and cheatgrass. Together they accounted for 70% of the grass cover and 51% of the herbaceous cover in 1996. It was noted in 1996 that much of the cheatgrass and Japanese brome was infested with a smut which effected seed production. During the 2001 reading, nested frequency and cover of Japanese brome declined, while that of cheatgrass increased. Combined they still dominate the site by providing 74% of the grass cover and 58% of the total herbaceous cover. Perennial grasses are represented by bluebunch wheatgrass, sand dropseed, purple three-awn, and Sandberg bluegrass. Forbs are dominated by ragweed and storksbill which currently ('01) account for 75% of the forb cover. Other common perennial forbs include Louisiana sage, thistle, and dyers woad. Overall, herbaceous composition is poor.

### 1984 APPARENT TREND ASSESSMENT

Overall trend from both soil and vegetative parameters appears to be in a state of decline. Erosion is unacceptably high and undesirable plants threaten to dominate the site. The key browse on the site, mountain big sagebrush, is extremely heavily hedged and half of the population is decadent. Reproduction is also poor.

### 1990 TREND ASSESSMENT

Changes in mountain big sagebrush growth form classification from heavily hedged in 1984 to lightly hedged in 1990, and the reduction in the percentage of decadent plants in the population are positive signs. However, no reproduction was found, perhaps due to the significant competition from the dense annual grass understory. Sagebrush canopy cover is estimated at about 2%. In addition, density declined 73% from 498 plants/acre to only 133. The frequency of bluebunch wheatgrass increased as did the frequency of dyers woad. Common ragweed is still very common with a quadrat frequency of 71%. The soil is rocky, but well protected by vegetative and litter cover.

#### TREND ASSESSMENT

soil - stable but poor condition (3)

browse - down (1)

herbaceous understory - stable but poor composition (3)

### 1996 TREND ASSESSMENT

Trend for soil has improved slightly due to an increase in litter cover and a decline in percent bare ground from 3% to <1%. Unfortunately, much of this increase is due to the thick stand of annual brome grasses which creates a substantial fire hazard. Erosion is not currently a problem. Preferred browse is limited on the site, but trend for the one key species, mountain big sagebrush, is up. Density of mature plants remained similar to 1990 estimates yet the proportion of young plants increased from 0 to 560 plants/acre. Utilization is light and vigor normal for most plants. Conversely, broom snakeweed increased 85% to a density of over 4,000 plants/acre. The herbaceous understory is dominated by annual grasses and weedy forbs. Sum of nested frequency for grasses declined slightly while frequency of perennial forbs increased. Sum of nested frequency for sand dropseed increased significantly, with the sum of nested frequency for Sandberg bluegrass declining significantly. Overall trend for the herbaceous understory is stable, but with a poor composition.

#### TREND ASSESSMENT

soil - improved slightly (4)

browse - up but still at a relatively low density (5)

herbaceous understory - stable but dominated by annuals and weedy species (3)

### 2001 TREND ASSESSMENT

Trend for soil is stable. There is abundant vegetation and litter cover to protect the soil and the erosion condition class was also determined to be stable. Trend for the key browse species, mountain big sagebrush, is up due to an 24% increase in density from 740 plants/acre to 980. The population has become increasingly mature, although young plants still account for 6% of the population. Use is light, vigor good, and percent decadence low at 8%. There has been little use of the sagebrush on this site since 1990 when heavy use was reported. Broom snakeweed has declined in density and the dry conditions have negatively effected the population which is now 40% decadent. Trend for the herbaceous understory is mixed. Sum of nested frequency for perennial grasses has increased slightly with a significant increase in the nested frequency of bluebunch wheatgrass. Sandberg bluegrass also increased significantly in nested frequency while sand

dropseed declined significantly. Sum of nested frequency for perennial forbs declined. However, ragweed and dyers woad declined significantly as well. Overall, trend for the herbaceous understory is considered slightly improved due to the increase in some of the more preferred species and reductions in some of the weedy forbs. The composition is still poor and dominated by cheatgrass, annual forbs, and weeds.

#### TREND ASSESSMENT

soil - stable (3)

browse - up (5)

herbaceous understory - up slightly (4)

#### HERBACEOUS TRENDS --

Herd unit 02 , Study no: 24

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'84	'90	'96	'01	'84	'90	'96	'01	'96	'01
G	Agropyron spicatum	<sub>a</sub> 10	<sub>b</sub> 66	<sub>b</sub> 65	<sub>c</sub> 110	4	25	26	42	3.67	5.74
G	Aristida purpurea	20	16	9	9	10	6	6	4	.78	.24
G	Bromus brizaeformis (a)	-	-	24	12	-	-	12	7	.28	.04
G	Bromus japonicus (a)	-	-	<sub>b</sub> 307	<sub>a</sub> 58	-	-	91	24	11.85	.39
G	Bromus tectorum (a)	-	-	<sub>a</sub> 306	<sub>b</sub> 328	-	-	89	89	11.59	24.25
G	Festuca myuros (a)	-	-	9	5	-	-	3	2	.01	.04
G	Oryzopsis hymenoides	-	-	-	2	-	-	-	1	-	.00
G	Poa pratensis	<sub>a</sub> -	<sub>b</sub> 9	<sub>a</sub> -	<sub>ab</sub> 6	-	5	-	2	-	.03
G	Poa secunda	<sub>a</sub> -	<sub>c</sub> 74	<sub>b</sub> 36	<sub>c</sub> 66	-	33	17	31	.29	.54
G	Sporobolus cryptandrus	<sub>c</sub> 114	<sub>ab</sub> 81	<sub>bc</sub> 107	<sub>a</sub> 53	54	29	41	21	5.01	1.97
Total for Annual Grasses		0	0	646	403	0	0	195	122	23.73	24.72
Total for Perennial Grasses		144	246	217	246	68	98	90	101	9.77	8.54
Total for Grasses		144	246	863	649	68	98	285	223	33.51	33.27
F	Achillea millefolium	<sub>b</sub> 32	<sub>b</sub> 28	<sub>b</sub> 34	<sub>a</sub> 1	16	11	19	1	.85	.00
F	Alyssum alyssoides (a)	-	-	<sub>a</sub> 14	<sub>b</sub> 31	-	-	7	15	.03	.08
F	Allium spp.	-	-	-	8	-	-	-	5	-	.02
F	Ambrosia psilostachya	<sub>c</sub> 214	<sub>b</sub> 165	<sub>b</sub> 160	<sub>a</sub> 48	75	71	69	22	6.31	1.78
F	Artemisia ludoviciana	40	32	28	29	17	14	14	14	.77	.72
F	Asclepias asperula	-	-	-	1	-	-	-	1	-	.03
F	Calochortus nuttallii	<sub>a</sub> -	<sub>a</sub> -	<sub>ab</sub> 6	<sub>b</sub> 20	-	-	4	9	.02	.05
F	Cirsium undulatum	<sub>a</sub> -	<sub>a</sub> 2	<sub>b</sub> 21	<sub>a</sub> 3	-	1	11	2	1.14	.03
F	Comandra pallida	-	2	-	-	-	1	-	-	-	-
F	Cryptantha spp.	-	-	4	-	-	-	2	-	.41	-
F	Descurainia pinnata (a)	-	-	-	2	-	-	-	1	-	.00
F	Epilobium brachycarpum (a)	-	-	<sub>b</sub> 75	<sub>a</sub> 6	-	-	36	3	.52	.01
F	Erodium cicutarium (a)	-	-	<sub>a</sub> 32	<sub>b</sub> 209	-	-	13	69	.36	5.21

T y p e	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'84	'90	'96	'01	'84	'90	'96	'01	'96	'01
F	Erigeron pumilus	-	-	3	-	-	-	1	-	.00	-
F	Euphorbia spp.	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 15	<sub>a</sub> -	-	-	5	-	.46	-
F	Helianthus annuus (a)	-	-	5	4	-	-	3	1	.04	.41
F	Heterotheca villosa	-	-	2	5	-	-	1	2	.53	.24
F	Holosteum umbellatum (a)	-	-	-	144	-	-	-	55	-	.35
F	Isatis tinctoria	<sub>a</sub> -	<sub>b</sub> 41	<sub>b</sub> 32	<sub>a</sub> 3	-	16	14	3	.29	.16
F	Lactuca serriola	<sub>a</sub> -	<sub>a</sub> -	<sub>b</sub> 14	<sub>a</sub> 1	-	-	8	1	.09	.00
F	Lithospermum ruderales	<sub>b</sub> 31	<sub>a</sub> 2	<sub>a</sub> 8	<sub>a</sub> 11	16	1	4	4	.18	.09
F	Machaeranthera canescens	<sub>a</sub> -	<sub>b</sub> 14	<sub>b</sub> 11	<sub>a</sub> 1	-	8	6	1	.15	.03
F	Machaeranthera grindelioides	-	-	5	-	-	-	4	-	.07	-
F	Plantago patagonica (a)	-	-	3	4	-	-	2	2	.01	.01
F	Solidago spp.	3	4	-	-	1	1	-	-	-	-
F	Tragopogon dubius	1	-	9	2	1	-	4	1	.07	.00
Total for Annual Forbs		0	0	129	400	0	0	61	146	0.96	6.08
Total for Perennial Forbs		321	290	352	133	126	124	166	66	11.40	3.20
Total for Forbs		321	290	481	533	126	124	227	212	12.37	9.29

Values with different subscript letters are significantly different at alpha = 0.10 (annuals excluded)

#### BROWSE TRENDS --

Herd unit 02 , Study no: 24

T y p e	Species	Strip Frequency		Average Cover %	
		'96	'01	'96	'01
B	Artemisia tridentata vaseyana	24	35	.93	8.20
B	Gutierrezia sarothrae	50	44	3.23	6.83
B	Rosa woodsii	1	2	.38	.30
Total for Browse		75	81	4.55	15.33

BASIC COVER --

Herd unit 02 , Study no: 24

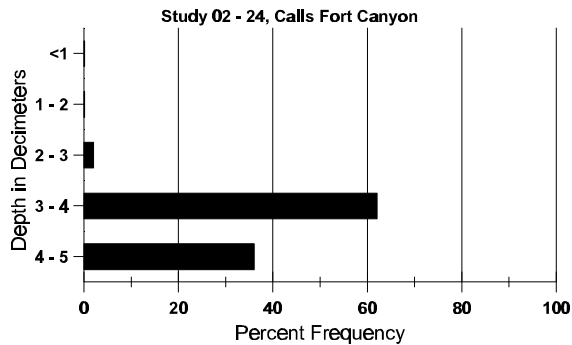
Cover Type	Nested Frequency		Average Cover %			
	'96	'01	'84	'90	'96	'01
Vegetation	382	369	1.50	16.00	54.32	60.32
Rock	176	152	14.25	16.75	9.64	12.16
Pavement	58	152	10.50	6.50	1.75	9.73
Litter	386	365	64.00	57.25	68.01	40.36
Cryptogams	3	5	0	.50	.00	.06
Bare Ground	35	15	9.75	3.00	.65	.10

SOIL ANALYSIS DATA --

Herd Unit 02, Study no: 24, Calls Fort Canyon

Effective rooting depth (in)	Temp °F (depth)	PH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
12.4	77.8 (13.9)	7.7	41.7	31.0	27.3	3.8	7.3	195.2	.6

## Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 02 , Study no: 24

Type	Quadrat Frequency		Pellet Transect	
	'96	'01	Pellet Groups per Acre	Days Use per Acre (ha)
			01	01
Rabbit	1	-	26	N/A
Elk	2	-	-	-
Deer	2	3	70	5 (13)

## BROWSE CHARACTERISTICS --

Herd unit 02 , Study no: 24

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia tridentata vaseyana																		
S	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	84	-	-	2	-	-	-	-	-	-	2	-	-	-	66		2	
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	96	28	-	-	-	-	-	-	-	-	28	-	-	-	560		28	
	01	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3	
M	84	-	-	5	-	-	-	-	-	-	5	-	-	-	166	23	18	5
	90	4	-	-	-	-	-	-	-	-	4	-	-	-	133	21	19	4
	96	7	-	-	-	-	-	-	-	-	7	-	-	-	140	28	38	7
	01	40	2	-	-	-	-	-	-	-	42	-	-	-	840	29	36	42
D	84	-	-	8	-	-	-	-	-	-	6	-	2	-	266		8	
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	96	2	-	-	-	-	-	-	-	-	1	-	-	1	40		2	
	01	3	1	-	-	-	-	-	-	-	4	-	-	-	80		4	
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	740		37	
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	320		16	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		00%			100%			13%			-73%							
'90		00%			00%			00%			+82%							
'96		00%			00%			03%			+24%							
'01		06%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	498	Dec:	53%			
												'90	133		0%			
												'96	740		5%			
												'01	980		8%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus viscidiflorus viscidiflorus																		
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0	12	17	0
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		00%			00%			00%										
'90		00%			00%			00%										
'96		00%			00%			00%										
'01		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	0	Dec:	-			
												'90	0		-			
												'96	0		-			
												'01	0		-			
Gutierrezia sarothrae																		
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	5	-	-	-	-	-	-	-	-	5	-	-	-	166			5
	96	21	-	-	-	-	-	-	-	-	21	-	-	-	420			21
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	13	-	-	-	-	-	-	-	-	13	-	-	-	433	19	28	13
	96	181	-	-	-	-	-	-	-	-	181	-	-	-	3620	16	19	181
	01	98	-	-	-	-	-	-	-	-	98	-	-	-	1960	13	17	98
D	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	66	-	-	-	-	-	-	-	-	61	-	-	5	1320			66
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	140			7
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		00%			00%			00%										
'90		00%			00%			00%			+85%							
'96		00%			00%			00%			-19%							
'01		00%			00%			03%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	0	Dec:	0%			
												'90	599		0%			
												'96	4040		0%			
												'01	3280		40%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Rosa woodsii																		
M	'84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'96	1	-	-	-	-	-	-	-	-	1	-	-	-	20	64	72	1
	'01	2	-	-	-	-	-	-	-	-	2	-	-	-	40	60	51	2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
		'84 00%			00%			00%										
		'90 00%			00%			00%										
		'96 00%			00%			00%			+50%							
		'01 00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	0	Dec:	-			
												'90	0		-			
												'96	20		-			
												'01	40		-			